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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/508,758

05/11/2005

Fevzi Yildirim

10191/3437

8278

26646

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05/03/2006

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EXAMINER

BARNEY, SETH E

ART UNIT

3752

PAPER NUMBER

DATE MAILED: 05/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/508,758

Applicant(s)

YILDIRIM ET AL.

Examiner

Seth Barney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-11 is/are rejected.
- 7) ☒ Claim(s) 12-17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 9/22/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 9 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,142,443 to Potschin et al.

The Examiner notes that claim 9 recites functional language such as “adapted to close” and “adapted to open”. Functional language does not hold patentable weight and the prior art needs only be capable of performing the function being claimed.

Regarding claim 9, Potschin discloses a fuel injector having:

-a piezoelectric actuator (32);

-an hydraulic coupler including a master piston (31) and a slave piston (34). See

Figure 2.

-a valve needle (3) and a valve closure member (4) cooperating with a valve-seat (6) surface to form a valve-sealing seat. See Figure 1.

-wherein the actuator actuates via the hydraulic coupler the valve-closure member provided on the valve needle, and wherein a coupler gap (30) formed between the master piston and the slave piston is capable of closing in a cold state of the fuel injector and capable of opening via a temperature-related linear deformation of the actuator as a temperature of the fuel injector increases.

Potschin discloses that there is leakage along the piston guides and that there is a volume change in the fluid coupling gap. Furthermore, the volume change occurs because of temperature changes. In order to compensate for this loss of fluid a filling valve is provided to the coupling gap. See column 3 lines 34 to 40. Therefore, the fuel injector of Potschin is capable of having the fluid coupling gap being closed in a cold state when the injector has not been used and the fluid has all leaked out. The fuel injector of Potschin is also capable of having the fluid coupling gap open during a warmer state once the gap has been re-filled by the filling valve.

Regarding claim 11, the hydraulic coupler penetrates a sleeve (37), the sleeve abutting against a spring (42) via a flange (the part of the housing at 80 next to the sleeve).

3. Claims 9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Mattes (WO 01/14734).

The Examiner relies upon U.S. Patent No. 6,588,678 to Mattes as a translation of WO 01/14734.

Regarding claim 9, Mattes discloses a fuel injector having:

- a piezoelectric actuator (10).
- a hydraulic coupler including a master piston (16) and a slave piston (18).
- a valve needle (20) and a valve closure member (14) provided on the valve needle, the valve closure member cooperating with a valve seat surface to form a valving seat.

-wherein the actuator actuates via the hydraulic coupler the valve-closure member provided on the valve needle, and wherein a coupler gap (the free space that results from the difference in the length Δl of the piezoelectric adjustor, see Figures 1a and 1b) formed between the master piston and the slave piston is adapted to close in a cold state of the fuel injector and adapted to open via a temperature-related linear deformation of the actuator as a temperature of the fuel injector increases (See Figure 2). Figure 2 shows a graph of the change in length Δl and the stroke h plotted as a function of temperature.

Regarding claim 10, the coupler gap is between 25 micrometers and 50 micrometers at a temperature of about 20 degrees Celsius and a fuel pressure of about 0.5 MPa. See Figure 2.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,142,443 to Potschin et al.

Potschin discloses the claimed invention except for the coupler gap is between about 25 micrometers and 50 micrometers at a temperature of about 20 degrees Celsius and a fuel pressure of about 0.5 MPa. It would have been obvious to one having ordinary skill in the art at the time the invention was made to operate the fuel injector at these conditions, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Allowable Subject Matter

7. Claims 12-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 4,909,440 to Mitsuyasu et al. discloses a fluid gap. U.S. Patent No. 6,460,779 to Boecking discloses two pistons with a fluid gap in between. U.S. Patent No. 6,400,066 to Sumrak et al. discloses a gap between a piston

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and a needle. U.S. Patent No. 6,953,158 to Liskow discloses a gap between a piston and a valve needle. U.S. Patent No. 5,287,829 to Rose discloses a piston assembly having hydraulic fluid gaps.

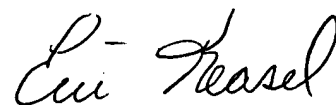
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seth Barney whose telephone number is (571)272-4896. The examiner can normally be reached on 7:30am-5:00pm (Mon-Fri), first Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Scherbel can be reached on (571)272-4919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Seth Barney
Examiner
Art Unit 3752

sb



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